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Kohler Schmid + Partner Ruppmannstr. 27 D-70565 Stuttgart, GERMANY			ROSENBERGER, FREDERICK F	
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			2884	

DATE MAILED: 03/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

### Period for Reply

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 29 March 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All    b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3&6/4.8&11/5.2/06.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

2. The information disclosure statement filed 24 February 2006 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because no document has been submitted for the listed webpage in item 5 of the Non-patent Literature. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

### ***Drawings***

3. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because Figure 2 is of poor quality making it difficult to discern certain features of the invention (i.e. sample 4 cannot be seen). Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent

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and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: **45** (page 10, line 16). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "**47**" has been used to designate both the spindle and the jaws in Figure 4. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each

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drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

6. Claim 6 is objected to because of the following informalities: There is two claims that have been numbered claim 6. For the purposes of this Office action, the claims have been interpreted such that the second claim 6 is referred to as claim 7, hereinafter. Similarly, claims 7-15 have been interpreted as claims 8-16 hereinafter. Thus, claims 1-16 are currently pending in this application. Appropriate correction is required.

7. Claims 10 and 11 are objected to because of the following informalities:

In claim 10, line 1, "said material" lacks proper antecedent basis in claim 1. For the purposes of this Office action, claim 10 is interpreted to depend upon claim 9 for proper antecedent basis.

In claim 11, line 1, "said displacing means" should probably be --said means for displacing-- for proper antecedent basis in claim 1.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

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8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "similar to" in claim 8 is a relative term which renders the claim indefinite. The term "similar to" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. In this case, applicant has referred to the shape of the beam stop as being similar to a truncated cone, but has not provided any guidance as to what range of shapes would be considered similar to a truncated cone. See MPEP 2173.05(b).

### ***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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11. Claims 1-3, 5-11, 13, and 16 are rejected under 35 U.S.C. 102(a) as being anticipated by Ellis et al. (Journal paper entitled "Beamstop with integrated X-ray sensor").

With regards to claim 1, Ellis et al. disclose an X-ray system for investigating a sample, the system comprising:

A source, in the form of the 11-1 beamline of X-ray radiation from the Stanford Synchrotron Radiation Laboratory (page 287, "1.Introduction"; Figure 1);

A detector, in the form of a large area mosaic CCD detector (page 287, "1.Introduction");

A beamstop between the detector and the sample, all collinear along a z-axis (page 287, "1.Introduction"; Figure 1);

And means for displacing said beamstop, in the form of a motorized x-y-z stage, for displacing the beamstop along the z-axis (page 288, "4.Field Trials", especially column 1).

With regards to claim 2, Ellis et al. disclose that the radiation is X-ray radiation diffracted from the sample (page 287, "1.Introduction", 1<sup>st</sup> paragraph).

With regards to claim 3, Ellis et al. disclose that optimal displacement and size of the beamstop is important in small-angle radiation studies (page 287, "1.Introduction", first paragraph).

With regards to claims 5 and 11, Ellis et al. disclose a motorized x-y-z stage for positioning the beamstop (page 288, "4.Field Trials", first paragraph).

With regards to claims 6 and 7, Ellis et al. illustrate that the cross-section of the beamstop is round or circular (Figure 2).

With regards to claim 8, Ellis et al. illustrate that the silver cup front part of the beamstop is similar to a truncated cone (Figure 2). Further Ellis et al. illustrate that the tungsten-epoxy composite in front of the photodiode is similar to a truncated cone (Figure 2).

With regards to claim 9 and 10, Ellis et al. disclose that the beamstop comprises tungsten, which has good radiation absorbing properties (Figure 2).

With regards to claim 13, Ellis et al. illustrate that the surface facing the primary beam is concave (Figure 2).

With regards to claim 16, Ellis et al. disclose a 2-D large area mosaic CCD detector (page 287, "1.Introduction"; Figure 1).

12. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

13. Claims 1-3, 9 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Chu et al. (Journal paper entitled "Kratky block-collimation small-angle X-ray diffractometer for synchrotron radiation").

With regards to claim 1, Chu et al. disclose an X-ray system for investigating a sample, the system comprising:



A source, in the form of SUNY X21A X-ray beamline of the National Synchrotron Light Source (abstract);

A detector, in the form of a linear position-sensitive detector **U** (Figure 1);

A beamstop **T** (Figure 1) between the sample **Y** and the detector **U** (Figure 2);

And means for displacing the beam stop along the z-axis such that the vacuum tube length between the sample **Y** and the beamstop **T** can be varied from 200mm to 1400mm (abstract; Figure 7; page 1161, bottom of column 1 through column 2).

With regards to claim 2, Chu et al. disclose that the radiation is either X-ray diffracted from the sample (abstract).

With regards to claim 3, Chu et al. disclose that the system is configured to measure small angle X-ray diffraction (abstract).

With regards to claim 9, the beamstop used by Chu et al. would inherently be made of a material with good radiation-absorbing properties, since it is the purpose of the beamstop to absorb primary radiation so as to protect the detector from damage.

With regards to claim 15, Chu et al. disclose a linear (i.e. one-dimensional) detector (caption of Figure 1).

14. Claims 1, 2, 6, 7, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Steinmeyer (US Patent # 5,008,909).

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With regards to claim 1, Steinmeyer discloses an X-ray system for investigating a sample, the system comprising:

A source **12** for directing a primary beam **14** of radiation onto a sample **15** (Figure 1);

A detector **18** for receiving radiation **16** from the sample;

A beamstop, in the form of mercury droplet **26**, disposed collinearly between the sample and the detector (Figure 1) and having a cross-section traverse to the z-axis to intercept the primary beam (Figures 1 and 2);

And means for displacing said beamstop **26**, in the form of micrometers **32** and shafts **34** for moving plate **24**, thus adjusting the width and thickness of the beamstop **26** and, in effect, moving the beamstop **26** along the z-axis for adjusting the amounts of radiation impinging on the detector **18** (column 4, lines 1-16).

With regards to claim 2, Steinmeyer disclose that the radiation from the sample is diffracted X-rays (column 1, lines 45-50; column 2, lines 13-16).

With regards to claims 6 and 7, Steinmeyer illustrate that the cross-section of the beamstop has a round or circular profile (Figure 2);

With regards to claim 9, Steinmeyer disclose that the beamstop is composed of mercury, which has good radiation-absorbing properties (column 4, lines 13-14).

15. Claims 1-4, 6-9, 13 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Kurbatov et al. (US Patent # 5,717,733).

With regards to claim 1, Kurbatov et al. disclose an X-ray or neutron system for investigating a sample, the system comprising:

A source **110** (Figure 1) for directing a primary beam of radiation onto a sample **140**;

A detector **170** for receiving radiation from the sample **140**;

A beamstop **150, 158** (column 6, lines 33-35; Figure 4) disposed between the sample **140** and the detector **170** wherein the source, sample, beam stop and detector are collinear (Figures 1-4) and said beam stop has a cross-sectional shape traverse to the z-axis (Figure 4); and

Means for displacing said beam stop along the z-axis for adjusting the position of the beamstop **150** with respect to the object **140** (column 7, lines 23-27).

With regards to claim 2, Kurbatov et al. disclose that the X-ray radiation is diffracted by the sample (abstract).

With regards to claims 3 and 4, Kurbatov et al. disclose measurement of radiation diffracted at angles less than  $0.36^\circ$  (Table 1; column 8, lines 57-60).

With regards to claims 6 and 7, Kurbatov et al. disclose that the beamstop have round or circular cross-sections (column 6, lines 45-50).

With regards to claim 8, Kurbatov et al. illustrate that the beamstop **150, 158** has the form of a truncated cone (Figure 4).

With regards to claim 9, Kurbatov et al. disclose that the beamstop is made of a highly absorbing material (column 6, lines 48-50).

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With regards to claim 13, Kurbatov et al. disclose that the beamstop is concave (Figure 4; column 6, lines 48-50).

With regards to claim 16, Kurbatov et al. disclose that the detector is a two-dimensional detector (column 7, lines 39-44).

***Claim Rejections - 35 USC § 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

18. Claims 4, 12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellis et al., as applied to claims 1 and 3 above.

With regards to claim 4, Ellis et al. disclose all the limitations of claims 1 and 3, as discussed above. Although Ellis et al. discuss the apparatus being a small-angle measuring apparatus, Ellis et al. are silent with regards to the range of angles measured. However, it is well known in the art that the small-angles measured in a small-angle measuring apparatus are typically less than  $5^\circ$  since small angle approximations are only valid for this range. Further, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to measure radiation between  $0.1^\circ$  and  $5^\circ$ , since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

With regards to claim 12, Ellis et al. are silent with regards to the system being automatically adjusted in accordance with predetermined criteria. However, Ellis et al. do provide for a detector within the beamstop to allow for rapid alignment with the primary beam (page 287, "1.Introduction", 2<sup>nd</sup> paragraph). It would have been obvious to one having ordinary skill in the art at the time the invention was made to automatically adjust the beamstop to align with primary beam, since it has been held that broadly providing a mechanical or automatic means to replace manual activity which has accomplished the same result involves only routine skill in the art. In re Venner, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958).

Further, with regards to claim 12, applicant uses the phrase "the system can be..." which is essentially equivalent to "capable of". Claim scope is not limited by claim language that suggests or makes optional but does not require steps to be performed,

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or by claim language that does not limit a claim to a particular structure. As the particular structure which enables the automatic adjustment to be performed has not been defined by the claims, Ellis et al. would satisfy the limitations of claim 12.

With regards to claims 14 and 15, Ellis et al. are silent with regards to the use of a single element scanning or one-dimensional detector. However, such detectors are well known in the art for measuring small angle scattering or diffraction of X-rays or neutrons from an object. It would have been obvious for a person having ordinary skill in the art at the time the invention was made to use either a single element scanning detector or a one-dimensional detector for the two-dimensional detector, since the examiner takes Official Notice of the equivalence of the detectors for use in the small angle scattering or diffraction detection art and the selection of any of these known equivalents to measure the scattered or diffracted radiation would be within the level of ordinary skill in the art. See cited prior art for examples of such detectors used in small angle measurement systems.

19. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

20. Claims 10-12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurbatov et al., as applied to claim 1 above.

Kurbatov et al. disclose all the limitations of parent claim 1, as discussed above.

With regards to claim 10, Kurbatov et al. do not specifically disclose the materials, instead only specifying that the material be highly absorbing to the incident radiation (column 6, lines 48-50). It would have been obvious for one having ordinary skill in the art at the time the invention was made to use Au, Sb, Pb, W, or Bi for the material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

With regards to claim 11, Kurbatov et al. do not specifically mention that the means for displacing the beamstop comprise a motor. Instead, Kurbatov et al. only discuss that the beamstop **150** be movably mounted (column 7, lines 23-27). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a motor for moving the beamstops, since it has been held that broadly providing a mechanical or automatic means to replace manual activity which has accomplished the same result involves only routine skill in the art. In re Venner, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958).

With regards to claim 12, Kurbatov et al. are silent with regards to the system being automatically adjusted in accordance with predetermined criteria. However, Kurbatov et al. recognize that that beamstop **150** and other spatial filters can be movably mounted so as to prevent certain angles of diffracted radiation from reaching the detector (column 7, lines 18-27). It would have been obvious to one having ordinary skill in the art at the time the invention was made to automatically adjust the locations of the beamstops to prevent certain diffraction angles from reaching the detector, since it

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has been held that broadly providing a mechanical or automatic means to replace manual activity which has accomplished the same result involves only routine skill in the art. In re Venner, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958).

Further, with regards to claim 12, applicant uses the phrase "the system can be..." which is essentially equivalent to "capable of". Claim scope is not limited by claim language that suggests or makes optional but does not require steps to be performed, or by claim language that does not limit a claim to a particular structure. As the particular structure which enables the automatic adjustment to be performed has not been defined by the claims, Kurbatov et al. would satisfy the limitations of claim 12.

With regards to claims 14 and 15, Kurbatov et al. are silent with regards to the use of a single element scanning or one-dimensional detector. However, such detectors are well known in the art for measuring small angle scattering or diffraction of X-rays or neutrons from an object. It would have been obvious for a person having ordinary skill in the art at the time the invention was made to use either a single element scanning detector or a one-dimensional detector for the two-dimensional detector, since the examiner takes Official Notice of the equivalence of the detectors for use in the small angle scattering or diffraction detection art and the selection of any of these known equivalents to measure the scattered or diffracted radiation would be within the level of ordinary skill in the art. See cited prior art for examples of such detectors used in small angle measurement systems



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21. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurbatov et al., as applied to claim 1 above, and further in view of Anton Paar GmbH ("HR-PHK for Nanostar" Instruction Handbook, page 16).

With regards to claim 5, Kurbatov et al. disclose all the limitations of parent claim 1, as addressed above. Although Kurbatov et al. allow for motion in the z-direction, Kurbatov et al. do not specifically disclose that the beamstop can be adjusted in the x-y plane.

However, the adjustment of the beamstop in the x-y plane is well known in the art. For example, Anton Paar GmbH discloses a typical prior art primary beam stop wherein the beamstop 1 is coupled to micrometer drives 2 to allow for alignment of the beamstop with the primary beam, thus preventing damage to the detector by improper alignment.

Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Kurbatov et al. such that the beamstop can be adjusted in an x-y plane to allow for proper alignment with the primary beam and thus preventing damage to the detector by improper alignment, as taught by Anton Paar GmbH.

### ***Conclusion***

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Warburton et al. (US Patent # 6,125,165) disclose prior art methods using a single detector with scanning to cover the diffracted X-ray angles as well as a linear detector (column 2, line 60 – column 3, line 5).

Howe et al. (US Patent # 4,710,259) disclose a 0-D scanning detection system in an X-ray diffraction measurement (Figure 3).

Tatsumi et al. (US Patent # 4,634,490) disclose prior art methods using a 0-D scanning detection system for X-ray diffraction measurements (Figure 1).

Hoshino (US Patent # 6,937,695) discloses the advantages of a 2-D X-ray detector over 0-D and 1-D X-ray detectors in X-ray analysis (column 4, lines 37-52).

European Synchrotron Radiation Facility webpages disclose a synchrotron beamline with a beamstop capable of x-y-z motion, although only the x-y motions are motorized.


23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frederick F. Rosenberger whose telephone number is 571-272-6107. The examiner can normally be reached on Monday-Friday 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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